

Claims

1. A pressure detecting apparatus utilizing electromagnetic coupling comprising:

a sensor section including first coils, second coils provided such that they are superimposed with the first coils, and a first cushion member provided between the first and second coils,

a drive circuit for driving either of the first coils and the second coils, and

a detection circuit for detecting pressure to be applied against the sensor section based on signals resulting from electromagnetic coupling from the other of the first coils and the second coils.

2. The pressure detecting apparatus as defined in claim 1, characterized in that the sensor section further includes:

third coils provided at a position where the second coils oppose to the first coils such that the third coils are superimposed with the second coils, and

a second cushion member provided between the second coils and the third coils and having a modulus of elasticity which is different from that of the first cushion member.

3. The pressure detecting apparatus as defined in claim 2, characterized in that the first coils and the third coils are wired such that they counteract magnetic field, the drive circuit causes the first coils and the third coils to drive, and the detection circuit detects signals resulting from electromagnetic coupling from the second coils.

4. The pressure detecting apparatus as defined in claim 2, characterized in that the drive circuit causes the second coils

to drive and the detection circuit detects the difference between the signals resulting from electromagnetic coupling from the first coils and the third coils.

5. The pressure detecting apparatus as defined in claim 4, characterized in that the detection circuit includes a differential amplifier and the difference between the signals is detected by inputting the signals resulting from electromagnetic coupling respectively from the first coils and the third coils to the input terminal of the differential amplifier.

6. The pressure detecting apparatus as defined in any one of claims 2 to 5, characterized in that the apparatus is constructed so that it can measure the pressure distribution by disposing a plurality of the sensor sections in a matrix state, forming the first coils into a plurality of coil rows connected in series in the direction of the X-axis, respectively, forming the second coils into a plurality of coil rows connected in series in the direction of the Y-axis, respectively, and forming the third coils into a plurality of coil rows connected in series in the direction of X-axis, respectively.

7. The pressure detecting apparatus as defined in claim 1, characterized in that the apparatus is constructed so that it can measure the pressure distribution by disposing a plurality of the sensor sections in a matrix state, forming the first coils into a plurality of coil rows connected in series in the direction of the X-axis, respectively, and forming the second coils into a plurality of coil rows connected in series in the direction of the Y-axis, respectively.

8. The pressure detecting apparatus as defined in claim 6

or 8, characterized in that the coil rows other than coils row to which the drive circuit or the detection circuit is connected are disconnected or opened.

9. The pressure detecting apparatus as defined in any one of claims 6 to 8, characterized in that the apparatus further includes a switching means for connecting the coil rows to the drive circuit or the detection circuit in turn.

10. The pressure detecting apparatus as defined in 6 or 7, characterized in that one end of the respective coil rows is grounded and the other end thereof is connected with the drive circuit or the detection circuit, the drive circuit includes a plurality of current drivers for driving each of the plurality of coil rows to be driven with different wave forms, and the detection circuit includes a plurality of current amplifiers for receiving signals from each of the plurality of coil rows and a plurality of synchronous detection sections for separating the respective wave forms.

11. The pressure detecting apparatus as defined in any one of claims 6 to 10, characterized in that each of the coils in the coil rows is planar with a shape of polygonal, such as approximately square and octagonal, or approximately round, is divided at the substantially central portion, and each of the divided coils is connected with the neighbor coils in series.

12. The pressure detecting apparatus as defined in any one of claims 1 to 11, characterized in that the detection circuit includes a current amplifier of which input impedance is approximated to zero.

13. The pressure detecting apparatus as defined in any one of claims 1 to 12, characterized in that the drive circuit

includes a current driver of which output impedance is rendered at a high value.

14. The pressure detecting apparatus as defined in any one of claims 1 to 13, characterized in that a central portion and/or a peripheral area of the coil is formed in a hollow state.